

Urban Knitters on Interweaving Craft, Technologies and Urban Participation

Full paper

J. Meissner
Open Lab
Newcastle University
United Kingdom
J.L.Meissner2@newcastle.ac.uk

G. Fitzpatrick
TU Wien
(Vienna University of Technology)
Austria
geraldine.fitzpatrick@tuwien.ac.at

ABSTRACT

Technologies are increasingly reaching areas of everyday life that were previously separated from the digital world, including traditional crafts. HCI work has explored hybrid craft as activities that manipulate smart materials for interactive physical outcomes. This however, excludes the ways in which traditional crafts become hybrid through other related uses of digital technologies. This paper discusses how urban knitting, a collaborative textile craft augmenting public space, incorporates various online practices to facilitate urban participation. We conducted a survey with 40 urban knitters to identify the roles technologies play in their practices. The results illustrate how the participants use digital tools for personal inspiration, global collaboration, individual self-expression and collective meaning-making around their craft. Through discussing how technologies can re-contextualise creative craft practices, we contribute insights into how a wider understanding of hybrid craft is needed to embrace new design opportunities within this hybrid realm of urban citizenship.

CCS CONCEPTS

• **Human-centered computing** → Empirical studies in HCI

KEYWORDS

Crafts; hybrid craft; urban knitting; yarnbombing; guerrilla knitting; urban participation; social media; technology integration.

ACM Reference format:

J. Meissner, and G. Fitzpatrick. 2017. Urban Knitters on Interweaving Craft, Technologies and Urban Participation. In *Proceedings of the 8th International Conference on Communities and Technologies (C&T '17)*, 10 pages.

DOI: 10.1145/3083671.3083674



Figure 1: An example of urban knitting.

1 INTRODUCTION

Information and communication technologies have become an omnipresent part of urban daily life. This implies that technology invades areas which previously were separated from the digital world. However, this development seldom comes as a full replacement of what was before. Rather, people tend to use both traditional and new tools in combinations that make sense for them and their agendas. Through the specific ways in which people integrate and omit digital technology in their everyday life, they shape new hybrid practices to pursue their objectives. It is these organically emerging practices, their rootedness in everyday culture and their playful mixture of physical and digital means, which we see as an interesting space for design.

In this paper, we illustrate the potentials of such a wider notion of practice using the example of urban knitting, also known as yarnbombing and guerrilla knitting (see Figure 1). It is an intersection of handicraft and street art, where the artists use yarn, fibres, and traditional techniques such as knitting, crochet, and embroidery to modify urban infrastructure by creating

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.

C&T '17, June 26-30, 2017, Troyes, France

© 2017 Association for Computing Machinery.

ACM ISBN 978-1-4503-4854-6/17/06...\$15.00

<http://dx.doi.org/10.1145/3083671.3083674>

colourful installations. Since its emergence as a subcultural practice in the early 2000s, photos of light poles, trees, park benches, bikes, busses or buildings covered in yarn have gone viral in online media. Furthermore, it can be seen as the chosen tool of textile crafters to creatively express themselves and their opinions in public spaces [15].

We conducted an online survey with 40 urban knitters on how they integrate digital tools into their activities. While the crafting is physically still performed the same way as by many generations before, we were interested in exploring the roles of technologies within and surrounding the practice of urban knitting: How do current technologies serve the purposes of urban knitting projects? Which design potentials are there for future technology support? The results of our inductive qualitative analysis suggest understanding urban knitting as a hybrid craft in the wider sense. The crafting is embedded into a complex system of technology-mediated meta-activities. Mobile technologies, social media and other internet services play a major role in facilitating, organizing, sharing, and promoting such projects. Arguably, the fusion of online and offline practice enables traditional crafts to re-invent themselves by adapting to present-day lifestyles [36]. By analysing how urban knitters already expand their craft-related practices through using digital tools, we discuss different approaches for technologies to augment urban knitting practices based on the identified values and purposes and contribute insights on how a wider understanding of hybrid craft can inform design within this hybrid realm of urban citizenship.

2 RELATED WORK

Being a very specialised subcultural practice, urban knitting has not yet received much attention in HCI or Urban Informatics despite a rich body of related literature addressing street art, urbanity, and crafts. These are helpful starting points for discussion as we understand urban knitting to be an intersection of these three subtopics: It is a special instance of street art which situates its installations in urban space and uses textile craft techniques as its colourful medium.

HCI work on street art and graffiti [7,12,24,34] has often foregrounded aspects of location and illegality rather than the artistic sophistication in terms of applied techniques and diversity of used materials. Nonetheless, it has recognized street art as a rich source of inspiration for the design of different interactive systems. PlaceTagz [34] and StallTalk [12] are two examples which took graffiti as a 'design meme' and used mobile devices and QR-codes to create a digital memory for real world places. DigiGraff [23,24] used the reference to tagging as a means to explore the significance of locations in social media, while MobiSpray [33,35] focused on the performativity embodied in the act of spraying. Overall, this work highlights the importance of situatedness in public space, self-authorisation, and anonymity in the context of street art.

Urban informatics [6,10,11] and other work on civic engagement (e.g. [1,2,19]) have also discussed the relevance of public space as a site for design. Foth et al. [10] used a thematic

paradigm which interprets the urban context as the intersecting triad of people, place, and technology. However, there are many ways in which these components can be combined. As Cranshaw [9] pointed out, research in this area tends to go in two major directions, emphasizing either social processes (e.g. studies of citizen practices) or technological potentials (e.g. smart cities based on big data and machine learning applications).

An important aspect of HCI research on citizen engagement in urban space is the motivation of designing technologies for citizen empowerment [2,3,16,19,20,22,28]. Foth et al [10] argue however that the hybrid role of urban space is often neglected in this context. One strategy to deal with this weakness, they propose, would be to learn from urban guerrilla movements [11]. We suggest therefore to study urban knitters. They can be construed as a grassroots group of citizens who actively engage with their local surroundings while also being active on multiple levels of space (e.g. both locally and online). To date there is no academic understanding of how urban knitters engage technologies in their activities. We were interested in exploring this question and building an initial understanding to inform urban knitting rhetoric in HCI as a form of urban participation. This could then inform future design explorations to configure urban knitting and technology in new meaningful ways.

HCI work on crafts and Do-It-Yourself (DIY) (e.g. [21,30]) has described how traditional practices, previously separated from the digital world, have increasingly developed towards a practical convergence of the original activity and digital technologies. Technology can enhance craft and create activity-augmenting systems such as Spyn [29,31], metamoCrochet [26] or Movement Crafter [27]. Furthermore, craft can improve technology by giving it back hand-made aesthetics [17]. Golstejn et al. described hybrid crafting on a material level as 'everyday creative practices of using combinations of physical and digital materials, techniques or tools, to make interactive physical-digital creations' ([13], p.594). Their definition implies that not only process and materials are hybrid but also the outcomes. This is a relatively narrow perspective on hybrid craft which is shared by other work in this field (e.g. [5,37]).

Rosner et al. however identify novel design opportunities related to 'the use of computational resources within and around traditional modes of craft activity' ([32], p.181). This widens the discussion for traditional crafts that have been digitally re-contextualised. Urban knitting is such an instance, which, considering the original definition, would not count as a hybrid craft. Neither the materials nor the outcomes are usually very digital or interactive. However, we hypothesise that without any digital technologies urban knitting might look very different, or might not even exist. As such, we emphasise the importance of an analysis of this particular interweaving of digital tools and traditional craft practice; to expand the notion of hybrid crafts and to explore current and future roles for technologies within this realm.

3 METHOD

We outlined how a study of urban knitting can contribute by discussing it i) as a form of urban participation and ii) as a hybrid craft in a wider sense. To address the gaps in related work, we conducted a qualitative survey study. The decision to use an online questionnaire was informed by the lead researcher's own reflective practice as an urban knitter, and followed some initial explorative work including observations and workshops [25]. The aim of the survey was now to identify specific roles technologies play in urban knitting, allowing for informed critical reflection on how these relate to urbanity and craft, and what new design ideas they inspire.

The online survey was created using Google Forms. It comprised a brief introduction (disclosing the researchers and outlining their research aims) and thirteen questions grouped into three sections titled *Some basic demographics*, *Urban Knitting and You* and *Urban Knitting and Technology*. The first two parts were designed with the intention to learn about the social context of and individual approaches to urban knitting. The last section aimed at identifying relevant technologies and their specific purposes within this practice. As listed in Table 1, each section contained three to five questions, including a mix of closed and open-ended questions, which were mostly optional to answer. Multiple choice and checkbox type questions always included an 'Other' option by which participants could add an own write-in choice to the pre-defined sets of answers.

Table 1: Listing of the Survey Questions
 (m.c = multiple choice, c.b. = checkboxes)

Survey Question	Type	optional
1 Have you ever engaged in urban knitting?	m.c	No
Section "Some basic demographics"		
2 Gender	text	Yes
3 Age	text	Yes
4 Country of residence	text	Yes
5 Professional or employment status	text	Yes
Section "Urban Knitting and You"		
6 How did you find out about urban knitting?	m.c.	Yes
7 How would you characterise your main motivation for engaging in urban knitting?	c.b.	Yes
8 Please describe an urban knitting project which you are particularly proud of.	text	Yes
Section "Urban Knitting and Technology"		
9 How would you describe your general attitude towards technology?	scale	Yes
10 Which place does technology take in your urban knitting projects? (if any)	text	Yes
11 Which place does technology take in the urban knitting movement in general? (if any)	text	Yes
12 What do you think of this prototype [demonstrated in a video above]?	text	Yes
13 Do you have any other ideas how (digital) technologies could assist or enhance urban knitting?	text	Yes

The survey was online for 45 days and was advertised by sharing the link on various social media channels. This recruitment strategy was informed by the personal experience of the lead researcher who was previously active in urban knitting. The survey link was therefore disseminated in the form of public postings on the lead researcher's Facebook and Twitter profiles, as well as direct invitations to the members of urban knitting groups found on these networks. Some individuals who were reached this way shared the link among their own social media networks. In total, the questionnaire gathered responses from 49 participants. However, nine of these did not self-identify as urban knitters and were therefore excluded from the dataset. According to their answers, these individuals were either friends of active urban knitters or craft-enthusiasts interested in potentially engaging in urban knitting in the future. Since they reported that they had not (yet) participated in any initiative themselves, they did not fit the scope of this study.

The "raw" data with the responses was downloaded as a CSV-file from the online survey tool for further processing in an external spreadsheet application. The analysis was then done in two steps: First, we created descriptive statistics for applicable parts of the spreadsheet data. These quantified perspectives highlighted tendencies within the general demographics as well as popular answer selections on multiple choice and checkboxes questions. In a second step, we focused on the qualitative data. This involved categorising the participants' additions to pre-defined sets of answers and using inductive thematic analysis [4] on their responses to open-ended questions. The analysis proceeded through splitting the given quotes into thematic fragments and developing single-word codes to summarise reoccurring topics and particularly interesting aspects. These codes were then grouped to generate the themes presented below in the results.

The two-fold analysis approach comprising descriptive statistics and detailed qualitative analysis allowed us to develop a solid understanding of the urban knitting identities of the 40 valid participants in terms of their background and motivations to engage in this particular craft practice. We are aware of the limitations of working with a small data corpus and therefore do not suggest to generalise the survey outcomes. Especially, given the way participants were recruited online through mainstream social media channels, our results cannot be generalised for all urban knitters, since those who avoid the internet would not have had access to the online survey. However, these individuals (if not active online at all) would also not be the target group of design.

Having said that, through the multi-faceted analysis we could identify six important themes in relation to how the participants use technologies as part of their urban knitting. These provide good starting points to think more broadly about how to approach design for this particular user group. It is exactly this organically occurring interweaving and appropriation of digital or physical tools for shared collaborative and activist purposes that we suggest can be a rich source to inspire design.

4 URBAN KNITTERS

In the following we summarise the main findings based on the answers of the 40 valid participants. The results are structured in three main parts in which we describe i) what kind of people engage in urban knitting and why, ii) which specific roles technology plays in their practices, and iii) how the quality of their engagement in urban knitting aligns with participation in civic processes and activism.

4.1 Demographics of Participants

The survey asked optional questions regarding the participant's gender, age, country of residence and professional status, helping to outline commonalities and variances within the group. Even though there is not a typical or average urban knitter, the results indicated some tendencies in the quantitative data. 38 of the 40 participating urban knitters were female; only two self-described as male. The average as well as the median age was 45, with the youngest being 26 and the oldest 68 years old. The participants resided in nine different countries: Australia, New Zealand, UK, Austria, Germany, France, Ireland, Mexico and USA. They reported diverse occupations: some were retired (4), stayed at home for childcare (4) or had other reasons for not being economically active (such as disability status, sponsored studentships, unemployment, etc.). The reported areas of employment outline a heterogeneous range of fields: for example, a forester, a psychologist, a retail manager, a small business owner and an attendance officer. However, it is noteworthy that 20% of the respondents were creative professionals (e.g. fashion designer, photographer or artist).

4.2 Personal Background Stories

The survey addressed the participants' personal history with urban knitting. Their answers on the question about how they had found out about it clearly highlighted the importance of media. While few had first encountered knitted graffiti through workshop events (3), friends (2) or installations (1), most (34) heard about it through mainstream media channels. With 29 mentions (72.5% of the valid responses) the internet seems to clearly lead (cf. Figure 2). Printed magazines, newspapers and books were also named.

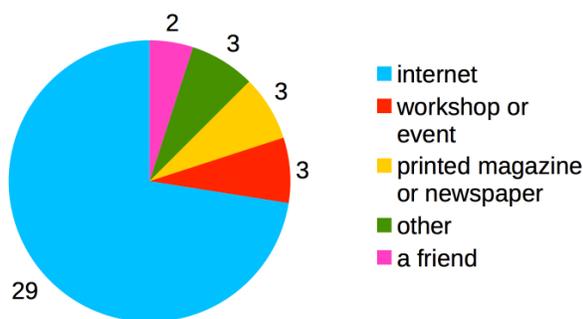


Figure 2: Survey results regarding the question of how the participants had initially found out about urban knitting.

A question with checkbox answers asked the participants for their main motivation to engage in urban knitting. The top three reasons selected were *fun* (67.5%), *creative self-expression* (65%) and *community engagement* (65%). *Personal utilisation of urban space* (37.5%) as well as *social reasons* (40%) and *activist causes* (25%) were relatively popular picks as well. Interestingly, while creative self-expression was stated as a main factor, recognition seemed to be far less important. *Making people smile, drawing them back to nature* and using it as a form of *self-therapy* were added as 'other' sources of motivation.



Figure 3: A selection of installations the artists reported to be proud of (the images were directly linked by them)

The participants were also asked to describe an urban knitting project of which they were particularly proud. Although the mentioned installations were diverse in their visual appearances and physical characteristics (cf. Figure 3), there seemed to be two main factors for making them outstandingly significant to their creators: Either if the project was of a large scale or if the project was initiated to support a good cause.

4.2.1 Large Scale. Many participants were proud of having been part of ambitious installation projects that impressed by size or mass. P35 mentioned for example "[t]he Woolly Walk Along - 80 meters of knitting along the Devonport wharf in Auckland, New Zealand, 2011", and P2 stated: "I've knitted a car! It took me 8 months of intensive crochet, to cover a car with knitting (Inside and outside), and it looks pretty awesome! :)" While P2 explicitly took her pride mainly out of the fact of having accomplished such a big project all by herself, it seems to be an exception; usually people collaborate on large projects. The Woolly Walk Along, for example, consisted of pieces knitted by over 90 people from nine different countries that were mailed to New Zealand. This account indicates how size and mass can turn urban knitting into a coordinative task of crowdsourcing the distribution of the workload.

4.2.2 In Support of a Good Cause. Besides its scale, the content of an installation seems to be another important issue: many report projects that allowed them to dedicate their work to good causes. However, it is up to the knitters themselves to decide what exactly might be a good initiative to campaign for with their craft. The topics mentioned in the answers were thus

diverse: P30 made a “sunshine tribute tree to raise awareness of domestic violence against women” whereas P14 participated in a collective craft memorial “in honour of a young girl who was murdered in a park”. P10 made six foot wings with hundreds of little watching eyes which “raised a lot of awareness of Anxiety disorder”, while P1 reported on a local craftivist campaign against a fracking company. P46 went for linguistic intervention: “We crocheted endangered German words and installed them at places where they fitted: e.g. *etepetete* in front of the Ritz Carlton Hotel, *Remmidemmi* on a bridge where people are spontaneously gathering to drink beer and have party.”

5 URBAN KNITTING AND TECHNOLOGY

The final section of the online survey focused on the individual perception and usage of technology. The respondents were asked to rate their general attitude towards technology on a scale from 1 (most negative) to 5 (most positive). This was an easily quantifiable measure to include in the questionnaire although each of the participants probably had different thoughts and expectations when confronted with the general term of technology. Having said this, the over-all perception associated with their individual notions seemed to be positive (cf. Figure 4). 77.5% of the respondents rated it with either 4 or 5, whereas no one picked 1 and only one person said 2 (who however didn't sound negative at all in the later technology-related questions); resulting in an average of 4.15 out of 5.

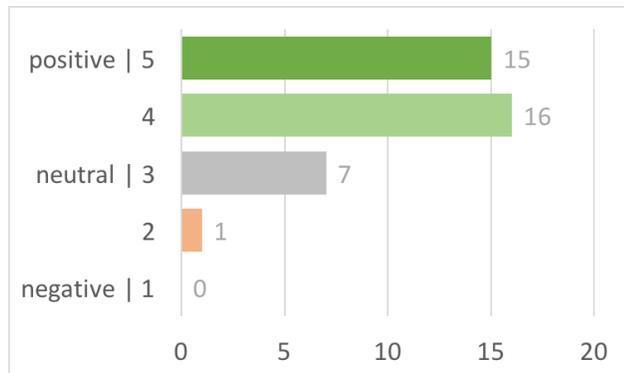


Figure 4: Survey results regarding how the participants rate their general attitude towards technology

The respondents were asked about the role technology plays in urban knitting (in terms of their own practices as well as the movement in general). While three participants (3.5%) did not see any connection at all, the others regarded certain parts of the involved practices tightly bound to the internet. Their answers provided an interesting portrayal of how popular online tools support many of the craft-extrinsic aspects and the emergence of a collective identity. There was a striking consensus on the choice of instruments among the survey participants. Most of the answers mentioned social media and online services. P10 wrote: “Technology in the computer sense can be a very great powerful

tool if you know how to use it correctly. Social Media blows me away in the sharing of my work.”, while P12 was a bit more specific about it: “I use various forms of social media including facebook, Instagram, Pinterest to show and share ideas and get inspiration. I occasionally read craft and art blogs and often purchase materials online.” Social media represents something like a universal resource; it offers a virtual infrastructure for most of the urban knitters’ needs and wishes. E-mail, blogs and online shops for craft supplies were also mentioned, but these often seemed to be used together with social media.

5.1 Technology Uses Around Urban Knitting

The specific mechanisms of the internet (and especially social media) providing a virtual infrastructure can be illustrated by the different ways that urban knitters use these digital tools. The participants reported using a combination of online services as a multifunctional tool for a wide range of purposes. For example, P11 used such technologies for “information, inspiration, patterns [and] connecting with others”, and P46 summarized it by “inspiration, exchange and communication”. Other respondents highlighted one or more functions as being especially important to their yarnbombing projects.

As described above, we applied thematic analysis on the responses and found six frequently mentioned categories of technology usages in the context of urban knitting:

5.1.1 Access and Networking. The answers often contained the word ‘connecting’. Many urban knitters seemed to look for like-minded people online. Sometimes this might even be the only way to get access, as in the case of P25: “I live in [a] rural area and connect with others in group through facebook sharing ideas photos of projects unfinished and finished.” Most of the time though, networking online was perceived as a means to integrate local action into a larger or even global framework: “Connection and collaboration online, especially through social media, has expanded my ideas and initiatives.” (P15)

5.1.2 Collaboration. Social media not only helped to “build a community of others who share [the same] interest” (P40), but also supported such groups operatively. Two participants mentioned Facebook events for setting up gatherings. P9 gave another example how this network can be used for efficiently organising projects: “The group I belong to, Yarn Corner, operates via a Facebook group. Here we list all our projects, sign up for them, and discuss how to go about our installations. The internet is essential to us as we have members from all over Australia and the world!”

5.1.3 Inspiration. Another key phrase in the responses was to share ideas. Participants referred here to their experience of frequently being inspired by like-minded peers or distributed visual media. “Searching online for ideas” (P18) and “to grab some inspiration (colors, techniques, style)” (P49) seemed to be common practices before beginning a project. P44 for example thought that it was a “great way to connect others, share photos, and find patterns to base work on. Huge portion of my research to prep a piece is done online.” Urban knitting seems to be embedded into an open sharing culture where it is natural to “share ideas on projects on social media” (P42) and to “[check] out other works of

yarn” (P31). Many participants did not seem to worry about their ideas being “stolen” by others and readily shared them within their smaller or larger communities. On the other hand, P10 also criticized sloppy copyright handling by others: “*What I notice is that credit to the artist is rarely given, this includes patterns too, I belong to many forums where patterns are passed for free even though the designer is selling them. It just belittles others work, Work photos are also stolen and end up in some weird places where people are making money off them!*”

5.1.4 Documentation. A great deal of the previously mentioned inspiration seemed to come from pictures and photos which other urban knitters had posted online to document their own projects. In fact, another important part of urban knitting projects seemed to be to “*share results, document progress*” (P40) and “*[show] our completed work*” (P34). Interestingly, the respondents rarely said why exactly they were doing so. Only P2 mentioned that “*it’s also for me a way to engage with people, making them smile... and I need photos for that and [a] computer too*”. However, due to their intentions not being made explicit, it can be assumed that there were other reasons involved as well.

5.1.5 Resources. The internet was also frequently described as a source for the supply of material and immaterial resources needed for urban knitting activities. This could manifest by “*ordering wool, searching for patterns*”, as P4 stated, or by “*using youtube videos to learn how to do new stitches*” according to P26. What P45 called “*sharing knowledge*” seemed to be a very important aspect here meeting the wish of others to learn. P9 reported for example that she managed to teach herself to crochet with the help of YouTube videos.

5.1.6 Amplification. Comparing the answers regarding their own personal practices to those discussing the technology effects on urban knitting in general, it was clear that the participants perceived that social media has the role of a megaphone. It could spread the word and might even contribute to forming a larger movement. P6 saw “*technology here more in the sense of media and information technology to provide a bigger stage for knitting projects or to gather together to share same interests*”, while P30 thought: “*It’s highly important for media coverage, raising awareness on a broader scale. Information can be accessed globally rather than locally or democratically.*” Another good example for the amplificatory role of technology was provided by P41: “*It is very important to take on board all technology where the result is people see that there are other ways of being. That the world can be more fun and more colourful and that knitting especially doesn’t belong with the aged and infirm - it is an activity which is fun, good for the soul, creative, artistic as well as plain useful.*”

5.2 Ideas for New Urban Knitting Technologies

The last survey question asked for practical ideas how technologies could be integrated in urban knitting. The responses comprised a diverse set of design ideas which mainly built on common and well-known mainstream technologies such as image-processing, GPS and online platforms.

Interestingly, many of the gathered suggestions had to do with location-based services. For example, some respondents wished for map annotation tools which would mark installations

and facilitate them being found by interested peers. P6 put the idea in the following words: “*[...] something like an app where people share urban knitting projects or pieces in a map. This would be fun. People take a picture of a piece and mark the place in a map all over the world. So other people could see what great installations are existing and also go visit them when they are around.*” Other participants imagined such a service more like a geocaching equivalent. P40 wrote for example “*GPS locators to help those seeking the installations to find them. Like a geocache.*” P34 even had a specific use scenario in mind for an internet-of-things-based version of geocaching: “*I like the idea of getting knitting/crochet into the outdoors and have participated in #yarnifiedlovebomb, creating little hearts to leave out and about with ‘You are loved’ on the label. I have just recently made some ducks for the ‘Little Yellow Duck’ project which is a similar concept that helps promote organ donation. The ducks are named and are logged onto a map when found. They have a QR code on the label to make life easier. I like the idea of maybe having a trail that people could follow through an app, of small installed pieces. I suppose a bit like geocaching but with woolly items.*”

Other ideas mainly related to technology integration for providing background information on the urban knitters and their projects or assisting the production of particularly complex techniques (e.g. intarsia patterns or a flexible conversion tool turning online images into knitting patterns).

5.3 Limits for Technology Integration

Despite their over-all positive attitude towards technology, the urban knitters also deliberately set a limit for technology integration into their urban knitting practices and expressed a clear preference of hand knitting over machine produced artefacts. There are of course no official rules prohibiting machine knitting as a production technique for urban knitting, but there is debate about its validity. While P40 states that “*[f]or many yarnbombers, knitting machines are an essential part of the process*”, P48 emphasizes proudly: “*we knit ourself, by hand*”. However, the mainstream standpoint seems to support the latter point of view, and the appreciation for the qualities inherent to the handcraft practice is widely shared. P1 wrote for instance: “*I don’t use a knitting machine, value the hands-on work, meditation in action for me!*” Doing the knitting by hand seems to add value both to the urban knitting practice and the installation outcomes.

6 URBAN KNITTING AS ACTIVISM

The previously outlined support of good causes and active online campaigning by urban knitters suggest an activist notion to their practices. Indeed, the survey results highlighted that participation in urban processes such as *community engagement*, *reclaiming urban/shared space* and *attracting attention in urban space* were often explicitly mentioned as main motivations to pursue urban knitting. One participant mentioned that her group was even officially collaborating with the local city council: “*[O]ur annual event, yarnbombing all the trees in the City Square (in Melbourne, Australia) looks spectacular*” (P9) Related to this project she addressed the role of technology for information and

public feedback: *“Technology is a great way to share your work. Yarn Corner have several videos on You Tube, and members of the public love to post photos of our installations (especially the City Square) on Instagram.”* This indicates how the group communicates their activities to the public by using social media.

Attracting attention in urban space was mentioned by almost a third of the survey participants as a major motivation of their urban knitting activities. Thinking of urban knitting installations as activist statements makes this aspect a key factor in activist urban knitting. In urban space attention is created by the unusual choice of yarn and handicraft as a colourful and soft media channel: *“Contributing to a groups project to attract attention to a charity it was covering lots of trees and posts in a city square. It [...] was truly beautiful and served its purpose.”* (P25) However, using ambiguity for creating attention often comes at the cost of mediating a clear message. Therefore, some urban knitters try to make their installation statements more explicit in their online presence using blogs, photos and social media postings. However, this information exists then without any connection to the physical installation: *“It would be good to provide a link or something (QR code perhaps) to allow urban knitters to explain their motivations and explain how urban knitting fits into the other things they do in their creative lives.”* (P15) While the information about the installation is provided on the internet, there is an apparent lack of tools for bridging the gap between the offline and online presence of urban knitting.

7 DISCUSSION

The findings highlight how social media and other digital technologies are used as handy multi-purpose tools for many different objectives in relation to urban knitting. In this section, we will discuss how we see this relating back to the HCI contexts of urban participation and crafts.

7.1 Urban Knitting as Urban Participation

Foth et al. [10] suggested an interpretative framework to understand urban contexts as an intersecting triad of people, place, and technology. Furthermore, as we have already outlined in the related work, they have even proposed that HCI research could learn from urban guerrilla movements to explore how citizens can proactively engage with their local and technological environment [11]. Their main argument for this is understanding such movements as ‘gatherings in urban public places [...] [that] use both realms of the digital (to organise, document, scale up) and the physical (to gather, perform, create spectacle)’ ([11], p.728). We have seen similar forms of activities in such a hybrid realm in the survey results. Since urban knitting is mostly found in urban space and relies on the craft and installation actions of citizens, we regard it to be important to discuss the role of technology in this civic context by looking at how it respectively connects to people and place.

Looking at the connection between people and technology, the survey results highlighted the ways in which the participants often utilised social media channels for their community

engagement, civic interventions, and activist agendas. It was often explicitly mentioned that participation in urban processes was a main motivation in the pursuit of urban knitting. For this endeavour, technologies were used mainly to access groups of like-minded people, starting collaborations, documenting the progress of their initiatives and amplifying their messages. Based on these results we align urban knitting as a form of civic participation with craftivism, the combination of craft and activism. Betsy Greer who has coined the term [15] suggested that such forms of textile-based interventions can be ‘a way of looking at life where voicing opinions through creativity makes your voice stronger, your compassion deeper & your quest for justice more infinite’¹. Accordingly, urban knitting constitutes a quiet but constructive form of activism which requires not only skill but also time, effort, and considerable personal investment by the creators [36].

Foth et al. have argued that one of the main weaknesses in urban informatics research is the lack of meaningful strategies [11]. We see technology-mediated urban knitting practices presenting a rich source for informing technology design. This is especially the case if these intend to serve the need for meaningful public involvement strategies and to offer more alternative space for participation than just giving citizens a voice in the form of a like-button. In fact, as the survey responses illustrated, urban knitting installations can be understood as activist statements which not only demand public attention but also communicate the opinions of caring citizens in support of good causes.

A second aspect in Foth et al.’s critique is related to neglecting the hybrid nature of urban space [11]. This allows us to discuss the specific connection between place and technology. Indeed, the choice of installation locations seems to be an important factor in urban knitting. The participants had many ideas for digital tools to navigate the audience to their installations, such as mapping apps and geocaching systems. This indicated the critical role of hybrid space and placed an emphasis on location-based technologies. In fact, ‘location-basedness’ could be a promising strategy to solve the big issue of activist urban knitting around the ambiguity of the physical installations and the messages they implicitly represented. For example, an app could automatically disclose some background information about the project as soon as the smartphone user is close to an associated urban knitting installation.

By relating our findings to the urban informatics agenda, we suggest understanding urban knitting as a meaningful form of urban participation which makes use of an alternative mode of expression. The conceptual intersection between people and technology is clearly characterised through web-mediated information, communication, and collective meaning making processes. The intersection between place and technology highlights new potentials for location-based design for closing remaining gaps in the mediation of the causes behind craft

¹ <http://craftivism.com/definition/> (accessed on 21.07.2016)

installations. Next, we address how urban knitting relates to wider HCI literature on crafts.

7.2 Urban Knitting as a Hybrid Craft Practice

The aspect of the deliberate separation of the manual act of knitting from technology strongly resonates with Goodman and Rosner's findings. Even though they never called the crafts they studied hybrid, they noted that their '[p]articipants described their handwork as part of an interpretative framework opposing manual aspects of handwork to technologies such as emails and robotics' ([14], p.2265). The authors described this opposition as a form of general resistance to all negative connotations with technologies (even though they could also observe how participants did in fact make use of phones, media, software and other technologies while performing their hobby).

However, in contrast to this rather ideological distinction between the positive values of handwork to negative characteristics of technology, our study findings suggest a slightly different perspective on such an intentional separation. The responses highlight an extended and more differentiated view on the role of technologies in present-day crafts. Indeed, some urban knitters still show a certain resistance to using technology directly within their manual craft practices (for example through the rejection of the use of knitting machines). However, this seems to be less a matter of channelling negative attitudes towards the digital in general and more a result of actively differentiating between tools for different purposes.

As we saw, the general preference still is clearly in favour of the manual execution of handcraft. Many of the participants chose to do the knitting by hand because they value it as a relaxing activity or because it is a deliberate statement of effort and devotion in their creative work (especially in relation to large-scale installation projects). At the same time, there is some space for pragmatism: knitting machines can be seen as a legitimate option to speed up the production process under certain circumstances (i.e. group, project and installation context), or a digital knitting pattern generator could support the visual outcome of the craft.

In the same work, Goodman and Rosner proposed three metaphors for technology integration in handwork practices which they called *extending*, *interjecting*, and *segmenting*. *Extending* referred to additional sensory stimuli within the embodied interaction, *interjecting* to deliberate handwork intermissions for briefly engaging in other activities, and *segmenting* to the different contexts in which the handwork takes place (e.g. materially, socially and emotionally). While extending and interjecting are interactional textures that directly need to happen during the act of crafting, segmenting allows discussion of handwork in a wider dimension of time and social relations. Our survey findings illustrate how urban knitters also understand technology usage around their handicraft as an integrated part of urban knitting. Therefore, by comparing these three metaphors with our survey results we argue that all six categories of technology usages are instances which expand and thereby refine the broad theme of segmentation. Some of the identified uses such as those related to resources or

documentation can certainly also occur in the form of extensions or interjections, but in a wider sense they all are important components (or segments) defining the present-day craft practice of urban knitting as a whole.

Furthermore, expanding the focus from technology integration *within* a craft towards integration *around* a craft corresponds to what Kuutti and Bannon have labelled the 'turn to practice in HCI' [18]. Instead of focussing on a specific interaction with one particular technology, many different technologies become part of a wider context of a social practice. Based on this holistic notion of practice and the refined view on the segmentation of handwork, urban knitting resides within an ecology of hybrid activities. Digital technologies are used to facilitate and mediate the physically performed traditional craft. For many of the survey participants it was common to prepare a new urban knitting contribution online, for example by buying wool or looking for inspiration. Large-scale installation projects often exploit crowd-sourcing concepts and depend on the participation of like-minded urban knitters locally or globally (as made possible by social media). The personal accounts of the survey participants suggest that urban knitters are appropriating online tools for their project purposes – just as they redesign public infrastructure without authority. At the same time, their online activities also directly shape their material manipulation activities in physical space. In a nutshell, urban knitting is performed in the form of both traditional activities and recent digital interactions within a hybrid realm of textile materials, technological resources, individual creativity and public space.

8 IMPLICATIONS FOR DESIGN

One aim with this survey was to identify the already existing roles of technology in urban knitting. Further, bringing together previous accounts on urbanity and crafts with our study results, several alternative directions for future work can be explored. While knitting (or other handicraft of personal choice) is still the most prominent activity involved in urban knitting and therefore seems to be an obvious starting point for design, we suggest that designers could also address any of the six identified purposes for using technology around urban knitting, and rather design for networking access, specialised collaboration, inspiration, documentation, supply of resources or amplification.

Earlier in this paper we reported on the different design ideas the survey participants had, however we do not suggest taking these literally into professional design. The participants are neither ICT experts nor designers, so what they report in their survey answers is highly framed by their experience of current mainstream technologies. However, they are an interesting group of open-minded technology users, and their answers point out certain values around their particular use of technologies. The reported variety of design ideas demonstrate a striking interest to actively experiment with and integrate technologies into their urban knitting practices. It is this attitude of proactively rethinking about how the tools they know can be appropriated to their urban knitting practices, that we suggest to learn from and inform design. For example, designers could

rethink the relevance of space and place in their work and reflect on this through alternative technological possibilities (i.e. sensor-based systems requiring direct physical interaction with the installations rather than annotated maps as suggested).

In general, we understand that the survey results point out three general implications for novel design in this direction:

First, designers need to take care not to interfere too much with the embodied material aspects of knitting as an activity. The integration of technology directly into the craft practice can be perceived as a highly disruptive intervention [8], however technologies can still be seen as part of urban knitting in the form of personal inspiration, global collaboration, individual self-expression and collective meaning-making around their craft. For instance, creating a smartphone app which turns photos automatically into a knitting pattern would still embrace the manual craft execution rather than interfere with it.

Second, many urban knitters are certainly not technology-averse and their use of social media could be exploited. As mentioned before, their own ideas for new digital tools demonstrated a certain willingness to experiment with existing and new technologies. This opens up design opportunities for coming up with novel technically more sophisticated systems than just re-inventing existing online platforms (i.e. Google Maps for urban knitting installations). For example, many urban knitters will arguably be familiar with the 'quantified self' concept. Combining such a design with the insight that manual crafting effort gives activist value to urban knitting could help to legitimise the relevance of installations. Thus, using trackers for stitches or the amount of yarn used could provide urban knitters with a tool which is not only relatable and accessible to them but also helps to visualise the value of handicraft as their chosen mode of expression (which still often tends to be marginalized as a women's pastime).

Third, if designers want to provide urban knitters with new meaningful technology, they need to design for a variety of motivations and accordingly allow practitioners to re-adapt the design outcomes for their individual purposes. Some urban knitters view themselves as craftivists, while others engage in it just for the sake of creativity. Again, for them it is a deliberate choice how and to what extent to use technologies. The general attitude towards technology can be put in a nutshell by quoting P4: "Everything except the knitting itself involves the internet."

CONCLUSION

In this paper, we presented the results of an online survey which gathered the personal accounts on urban knitting of 40 practitioners. The findings helped to highlight important characteristics from the creators' points of view and to see how other activities facilitated by technologies fit into their craft practice. Even though the online survey entailed a relatively small sample size from participants recruited through social media websites, which are likely to have influenced the results in terms of a higher-than-average approval of such media channels, the responses were helpful for drawing a bigger picture of urban

knitting as a collaborative hybrid craft intervention in local urban space with a global outreach facilitated by online media.

Furthermore, the results illustrated how these present-day crafters use social media and other digital tools to expand their craft practice and turn it into i) a hybrid craft in a wider sense and ii) a form of urban participation. Our participants reported how they embraced self-controlled technology integration in the broader context of their practice to facilitate and mediate urban knitting. We discussed how this insight can inform an interesting space for design which both allows for innovative technology applications and respects the personal preferences of present-day crafters, namely their passion for the physicality of craft, their positive attitude towards technology and their versatile motivations to engage.

ACKNOWLEDGMENTS

The authors would like to thank the survey participants for taking the time to fill out the online questionnaire and providing such a rich set of data.

The presented work is based on data gathered in course of a self-funded Master's dissertation project. However, the first author is kindly supported through the EPSRC CDT in Digital Civics (EP/L016176/1) which made this work and publication possible.

REFERENCES

- [1] Frank Bentley, Henriette Cramer, William Hamilton, and Santosh Basapur. 2012. Drawing the city. In *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12*, 1603–1606. DOI: <http://dx.doi.org/10.1145/2207676.2208282>
- [2] Solomon Bisker, Mark Gross, Donald Carter, Eric Paulos, and Stacey Kuznetsov. 2010. Personal, public. In *Proceedings of the 28th of the international conference extended abstracts on Human factors in computing systems - CHI EA '10*, 3547–3552. DOI: <http://dx.doi.org/10.1145/1753846.1754016>
- [3] Andrea Botero and Joanna Saad-Sulonen. 2010. Enhancing citizenship: the role of in-between infrastructures. In *PDC '10 Proceedings of the 11th Biennial Participatory Design Conference*, 81–90. DOI: <http://dx.doi.org/10.1145/1900441.1900453>
- [4] V. Braun and V. Clarke. 2006. Using thematic analysis in psychology. *Qualitative research in psychology* 3, 2, 77–101. DOI: <http://dx.doi.org/10.1191/1478088706qp063oa>
- [5] Leah Buechley and Hannah Perner-Wilson. 2012. Crafting technologies: Reimagining the processes, materials, and cultures of electronics. *ACM Transactions on Computer-Human Interaction* 19, 3, Article 21, 1–21. DOI: <http://dx.doi.org/10.1145/2362364.2362369>
- [6] Glenda Amayo Caldwell and Marcus Foth. 2014. DIY media architecture. In *Proceedings of the 2nd Media Architecture Biennale Conference on World Cities - MAB '14*, 1–10. DOI: <http://dx.doi.org/10.1145/2682884.2682893>
- [7] Scott Carter, Elizabeth Churchill, Laurent Denoue, Jonathan Helfman, and Les Nelson. 2004. Digital graffiti. In *Extended abstracts of the 2004 conference on Human factors and computing systems - CHI '04*, 1207–1210. DOI: <http://dx.doi.org/10.1145/985921.986025>
- [8] Amy Cheate and Steven J. Jackson. 2015. Digital Entanglements. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing - CSCW '15*, 958–968. DOI: <http://dx.doi.org/10.1145/2675133.2675291>
- [9] Justin Cranshaw. 2013. Whose "city of tomorrow" is it? In *Proceedings of the 2nd ACM SIGKDD International Workshop on Urban Computing - UrbComp '13*, 1. DOI: <http://dx.doi.org/10.1145/2505821.2505838>
- [10] Marcus Foth, Jaz Hee-jeong Choi, and Christine Satchell. 2011. Urban Informatics. In *Proceedings of the ACM 2011 conference on Computer supported cooperative work - CSCW '11*, 1–8. DOI: <http://dx.doi.org/10.1145/1958824.1958826>

- [11] Marcus Foth, Leonardo Parra Agudelo, and Robin Palleis. 2013. Digital soapboxes. In *Proceedings of the 2013 ACM conference on Pervasive and ubiquitous computing adjunct publication - UbiComp '13 Adjunct*, 725–728. DOI: <http://dx.doi.org/10.1145/2494091.2495995>
- [12] Jonathan Friedman and Michael S. Horn. 2013. StallTalk. In *CHI '13 Extended Abstracts on Human Factors in Computing Systems on - CHI EA '13*, 2179–2188. DOI: <http://dx.doi.org/10.1145/2468356.2468738>
- [13] Connie Golsteijn, Elise van den Hoven, David Frohlich, and Abigail Sellen. 2014. Hybrid crafting: towards an integrated practice of crafting with physical and digital components. *Personal and Ubiquitous Computing* 18, 3, 593–611. DOI: <http://dx.doi.org/10.1007/s00779-013-0684-9>
- [14] Elizabeth Goodman and Daniela Rosner. 2011. From garments to gardens. In *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11*, 2257–2266. DOI: <http://dx.doi.org/10.1145/1978942.1979273>
- [15] Betsy Greer. 2014. *Craftivism. The Art of Craft and Activism*. Arsenal Pulp Press, Vancouver.
- [16] Sibel Deren Guler. 2013. Citizen drones. In *Proceedings of the 7th International Conference on Tangible, Embedded and Embodied Interaction - TEI '13*, 349–350. DOI: <http://dx.doi.org/10.1145/2460625.2460688>
- [17] Scott E. Hudson. 2014. Printing teddy bears. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, 459–468. DOI: <http://dx.doi.org/10.1145/2556288.2557338>
- [18] Kari Kuutti and Liam J. Bannon. 2014. The turn to practice in HCI. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, 3543–3552. DOI: <http://dx.doi.org/10.1145/2556288.2557111>
- [19] Stacey Kuznetsov, George Noel Davis, Eric Paulos, Mark D. Gross, and Jian Chiu Cheung. 2011. Red balloon, green balloon, sensors in the sky. In *Proceedings of the 13th international conference on Ubiquitous computing - UbiComp '11*, 237–246. DOI: <http://dx.doi.org/10.1145/2030112.2030145>
- [20] Stacey Kuznetsov and Eric Paulos. 2010. Participatory Sensing in Public Spaces: Activating Urban Surfaces with Sensor Probes. In *DIS '10 Proceedings of the 8th ACM Conference on Designing Interactive Systems*, 21–30. DOI: <http://dx.doi.org/10.1145/1858171.1858175>
- [21] Stacey Kuznetsov and Eric Paulos. 2010. Rise of the expert amateur. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction Extending Boundaries - NordiCHI '10*, 295–304. DOI: <http://dx.doi.org/10.1145/1868914.1868950>
- [22] Stacey Kuznetsov, Eric Paulos, and Mark D. Gross. 2010. WallBots. In *Proceedings of the 8th ACM Conference on Designing Interactive Systems - DIS '10*, 208–217. DOI: <http://dx.doi.org/10.1145/1858171.1858208>
- [23] David McGookin, Stephen Brewster, and Georgi Christov. 2012. DigiGraff. In *Proceedings of the 2012 ACM annual conference extended abstracts on Human Factors in Computing Systems Extended Abstracts - CHI EA '12*, 2591–2596. DOI: <http://dx.doi.org/10.1145/2212776.2223841>
- [24] David K. McGookin, Stephen a. Brewster, and Georgi Christov. 2014. Studying digital graffiti as a location-based social network. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, 3269–3278. DOI: <http://dx.doi.org/10.1145/2556288.2557266>
- [25] Janis Lena Meissner. 2015. Tools for Wools: Learning from and Designing for Urban Knitters. Master's thesis. TU Wien (Vienna University of Technology), Vienna, Austria. Retrieved from <http://katalog.ub.tuwien.ac.at/AC12685309>
- [26] Momoko Okazaki, Ken Nakagaki, and Yasuaki Kakehi. 2014. metamoCrochet. In *ACM SIGGRAPH 2014 Posters on - SIGGRAPH '14*, 1–1. DOI: <http://dx.doi.org/10.1145/2614217.2633391>
- [27] Larissa Pschetz, Richard Banks, and Mike Molloy. 2013. Movement crafter. In *Proceedings of the 7th International Conference on Tangible, Embedded and Embodied Interaction - TEI '13*, 393–394. DOI: <http://dx.doi.org/10.1145/2460625.2460709>
- [28] Dimitrios Ringas and Eleni Christopoulou. 2013. Collective city memory. In *Proceedings of the 6th International Conference on Communities and Technologies - C&T '13*, 157–165. DOI: <http://dx.doi.org/10.1145/2482991.2482996>
- [29] D K Rosner and K Ryokai. 2010. Spyn: Augmenting the creative and communicative potential of craft. *Conference on Human Factors in Computing Systems - Proceedings* 4, 2407–2416. DOI: <http://dx.doi.org/10.1145/1753326.1753691>
- [30] Daniela Rosner and Jonathan Bean. 2009. Learning from IKEA hacking. In *Proceedings of the 27th international conference on Human factors in computing systems - CHI '09*, 419–422. DOI: <http://dx.doi.org/10.1145/1518701.1518768>
- [31] Daniela K. Rosner and Kimiko Ryokai. 2008. Spyn. In *Proceedings of the 10th international conference on Ubiquitous computing - UbiComp '08*, 340–349. DOI: <http://dx.doi.org/10.1145/1409635.1409682>
- [32] Daniela K Rosner, Miwa Ikemiya, and Tim Regan. 2015. Resisting Alignment. In *Proceedings of the Ninth International Conference on Tangible, Embedded, and Embodied Interaction - TEI '14*, 181–188. DOI: <http://dx.doi.org/10.1145/2677199.2680587>
- [33] Jürgen Scheible and Timo Ojala. 2009. MobiSpray: Mobile Phone as Virtual Spray Can for Painting BIG Anytime Anywhere on Anything. *Leonardo* 42, 4, 332–341. DOI: <http://dx.doi.org/10.1162/leon.2009.42.4.332>
- [34] Jan Seeburger. 2012. No cure for curiosity. In *Proceedings of the 7th Nordic Conference on Human-Computer Interaction Making Sense Through Design - NordiCHI '12*, 247–256. DOI: <http://dx.doi.org/10.1145/2399016.2399054>
- [35] David A. Shamma, Jürgen Scheible, and Renata M. Sheppard. 2009. Graffiti dance. In *Proceeding of the seventh ACM conference on Creativity and cognition - C&C '09*, 479–480. DOI: <http://dx.doi.org/10.1145/1640233.1640365>
- [36] Elena Solomon. 2013. Homemade and Hell Raising Through Craft, Activism, and Do-It-Yourself Culture. *PsychNology Journal* 11, 1, 11–20. Retrieved from [http://www.psychology.org/File/PNJ11\(1\)/PSYCHNOLOGY_JOURNAL_11_1_SOLOMON.pdf](http://www.psychology.org/File/PNJ11(1)/PSYCHNOLOGY_JOURNAL_11_1_SOLOMON.pdf)
- [37] Amit Zoran. 2015. Hybrid craft. In *ACM SIGGRAPH Art Gallery on - SIGGRAPH '15*, 384–398. DOI: <http://dx.doi.org/10.1145/2810185.2810187>